

# THE LANCET

## Infectious Diseases

### **Supplementary appendix**

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## **A SARS-CoV-2 omicron (B.1.1.529) variant outbreak in a primary school in Geneva, Switzerland: Supplementary Appendix**

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### **S1. Methods**

#### *Study design*

This outbreak investigation is part of a longitudinal, prospective, class-based, surveillance study (SEROCov-Schools), which aimed to describe the transmission dynamics of SARS-CoV-2 infection within primary schools and early childhood education centres in a sample of five institutions in Geneva, and the risk of introduction of SARS-CoV-2 into the children's households. The study started in October 2021 in the school described here. All four classes of children aged 3-7 years were eligible and included. All 72 eligible children (i.e. those in a participating class), were invited to participate, together with their teachers and school staff. In total, 68/72 pupils, 12/12 teachers, and 7/7 school staff were included.

Participants had a baseline assessment which included a serology from a capillary blood test (Neoteryx Mitra® collection device, tested for anti-Spike-SARS-CoV-2 IgG on a microfluidic nanoimmunoassay), a real-time reverse transcription polymerase chain reaction (RT-PCR) from an oropharyngeal swab sample, and the completion of an online questionnaire. Then, a surveillance phase started, with weekly contacts with the institution and self-declarations allowing participants to report COVID-19-like symptoms, contact with a positive case or the diagnosis of a SARS-CoV-2 infection. An outbreak investigation was triggered when a positive case was identified.

#### *School investigation*

For this outbreak investigation, the study population consisted of children and school staff from classes with a positive case. The four classes of children aged 3-7 years shared a large open space, which fostered interactions between classes. As a result, all four classes were considered exposed. This prospective investigation involved repeated visits with virological (RT-PCR on oropharyngeal swabs, performed twice on Day 3 and Day 7) and serological testing (capillary blood, performed twice on Day 3 and Day 42 [results not available yet]). We did not test participants who had tested positive in the 15 days before the first case was diagnosed (not considered as outbreak-related cases). Virological tests were not repeated in participants with a SARS-CoV-2 infection diagnosed between Day 0 and the day of the visit.

#### *Household investigation*

We also investigated the transmission of SARS-CoV-2 infections in households of children who tested positive. Household members (adults and children) who consented to participate were tested, unless they had tested positive in the 15 days before the first case was diagnosed (in this case, they were not considered as outbreak-related cases), or between D0 and the day of the visit, or had already had two negative tests since their child/sibling had tested positive. This prospective investigation also involved repeated visits with virological testing (RT-PCR on oropharyngeal swabs, performed twice on Day 7 and Day 10, or Day 10 and Day 13, depending on the date of the household index case) and serological testing (capillary blood, performed twice on Day 7 or Day 10 and Day 42 [results not available yet]). Vaccinated household members were not offered a serological testing, as the test used could not differentiate antibodies developed following infection or vaccination.

#### *Participation*

Among the eligible participants who did not test positive in the 15 days before the first case, participation rates were 71%, 75%, 90%, 100% in Classes A, B, C and D, 100% among staff members and 91% among household members.

#### *Case definition*

Confirmed cases were those with positive SARS-CoV-2 RT-PCR results. Probable cases were defined as children who had COVID-consistent symptoms and whose families were infected, but who were not tested. Cases could be further classified as symptomatic or asymptomatic. Contact tracing interviews were conducted for all confirmed

cases. Adults were defined as individuals  $\geq 18$  years, whereas children were defined as individuals  $< 18$  years of age.

### *Outcomes*

Only descriptive analyses are presented here. We assessed the proportion of classes and households with 1 or more SARS-CoV-2 infections. Cumulative infection incidence was defined as the number of children, teachers and school staff with a positive RT-PCR detected within a 21-day period of the index case identification, divided by the total number of children, teachers and school staff participating in the study who did not test positive in the 15 days before the first case was diagnosed. Household cumulative infection incidence was defined as the number of non-index household members with a positive test detected within a 21-day period of the first infection(s) detected in each household, divided by the total number of non-index members participating in the study in the affected household who did not test positive in the 15 days before the first case.

Plausible directions of transmission were determined, when possible, on the basis of symptom onset and testing dates.

### *Prevention measures in the school setting*

Infection prevention measures consisted of face masks for adults and regular hand washing, no other systematic measures, such as mechanical ventilation system or air-quality monitoring, were in place.

S2. Overview of tests results, symptoms and cases among the 4 investigated classes, teachers, non-teaching staff and household members

	Participants	Prior to visit 1 <sup>a</sup>	Visit 1 – Day 3 <sup>b</sup>		Day 4–Day 6	Visit 2 - Day 7 <sup>b</sup>		Visit 3 – Day 10 <sup>b</sup>		After visit 3 <sup>a,b</sup>	Total cases <sup>c</sup>	Symptoms <sup>d</sup>
	n/N	RT-PCR+ n (date of positive test) <sup>e</sup>	n tested/N eligible	n RT-PCR +/n tested	RT-PCR+ n (date of positive test)	n tested/N eligible	n RT- PCR+/n tested	n tested/N eligible	n RT- PCR+/n tested	RT-PCR+ n (date of positive test)	n confirmed [ <i>probable</i> ] cases /n tested (%)	n/n confirmed [ <i>probable</i> ] cases
Class A	<b>Children</b> (3-4 y.o.): 16/18	-	10/16	1/10	-	10/15	2/10	1/1 <sup>f</sup>	1/1	-	4/12 (33%) [5/12 (42%)]	3/4 [4/5]
	<b>Teachers:</b> 4/4	1 (D-4)	2/3	0/2	-	3/3	1/3	-	-	1 (D20)	2/3 (67%)	2/2
	<b>Total:</b> 20/22	1	12/19	1/12	-	13/19	3/13	1/1	1/1	1	6/15 (40%)	5/6 [6/7]
Class B	<b>Children</b> (4-5 y.o.): 18/18	-	13/18	1/13	-	11/17	1/11	-	-	-	2/13 (15%)	1/2
	<b>Teachers:</b> 3/3	1 (D-6)	1/2	0/1	-	1/2	0/1	-	-	-	0/2 (0%)	-
	<b>Total:</b> 21/21	1	14/20	1/14	-	12/19	1/12	-	-	-	2/15 (13%)	1/2
Class C	<b>Children</b> (5-6 y.o.): 16/18 <sup>g</sup>	1 (D0) <sup>h</sup>	13/15	6/13	1 (D4)	7/8	0/7	-	-	1 (D11)	9/16 (56%)	7/9
	<b>Teachers:</b> 3/3	-	3/3	1/3	-	2/2	0/2	-	-	1 (D13)	2/3 (67%)	2/2
	<b>Total:</b> 19/21	1	16/18	7/16	1	9/10	0/9	-	-	2	11/19 (58%)	9/11
Class D	<b>Children</b> (5-7 y.o.): 18/18	-	16/18	3/16	-	15/15	7/15	-	-	1 (D13)	11/18 (61%)	11/11
	<b>Teachers:</b> 2/2	-	2/2	0/2	-	2/2	0/2	-	-	1 (D17)	1/2 (50%)	1/1
	<b>Total:</b> 20/20	-	18/20	3/18	-	17/17	7/17	-	-	1	12/20 (60%)	12/12
Non-teaching staff	<b>Total:</b> 7/7	3 (D-15, D-2, D1)	3/4	0/3	-	3/4	0/3	-	-	-	1/5 (20%)	1/1
Household members <sup>i</sup>	<b>Siblings:</b> 14/17	2 (D-15, D-1)	1/1	0/1	1 (D6)	7/9	3/7	4/5	1/4	2 (D11, D14)	7/12 (58%) <sup>j</sup> [9/14 (64%)]	3/5 <sup>j</sup> [5/7]
	<b>Adults:</b> 43/46	4 (D-9, D-9, D-1, D0)	3/3	0/3	3 (D5, D6, D6)	20/24	7/20	19/22	3/19	4 (D11, D13, D13, D13)	18/40 (45%) <sup>k</sup>	13/16 <sup>l</sup>
	<b>Total:</b> 57/63	5	4/4	0/4	4	27/33	10/27	23/27	4/23	6	25/52 (48%) [27/54 (50%)]	16/21 [18/23]

Dx: number of days after the first case was diagnosed at school (January 11, 2022); D-x: number of days before the first case was diagnosed at school (January 11, 2022); y.o.: years old

<sup>a</sup> All participants were asked whether they had tested positive before the outbreak, and if they had a positive test after the last study visit.

<sup>b</sup> Eligibility criteria: Visits 1 and 2 = all participants from the 4 classes and school staff who had not tested positive in the 15 days before the first case was diagnosed or between D0 and the day of the visit. Visits 1, 2 and 3: all household members (adults and children) of infected children who agreed to participate, unless they had tested positive in the

15 days before the first case was diagnosed, or between D0 and the day of the visit, or had already had two negative tests. During Visit 1, we tested the families of two pupils who had had a positive self-test on the same day, confirmed by a positive RT-PCR. Tests were not repeated in participants with a SARS-CoV-2 infection diagnosed at a previous visit.

<sup>c</sup> A confirmed case was defined as a participant with a positive RT-PCR, a probable case was a child from an infected family who had symptoms but was not tested. Only cases identified from D0 are considered as related to this outbreak and are reported in this column.

<sup>d</sup> Among confirmed cases [*probable cases*]

<sup>e</sup> Participants who tested positive in the 15 days before the outbreak onset were not tested again during the outbreak, because we considered that they were not likely to be re-infected, and because PCR tests can remain positive for a few weeks.

<sup>f</sup> This child was tested a third time after his/her sibling from another class tested positive at Visit 2.

<sup>g</sup> One participant tested positive on January 12. He/she had not been exposed at school, as he/she was in quarantine since January 8 when a household member tested positive. This participant was not considered an outbreak-related case.

<sup>h</sup> First diagnosed case who triggered the investigation

<sup>i</sup> 3 parents and 3 siblings refused to be tested, 2 parents were also a teacher and a staff member and are included as such in this table. Siblings of positive children who were part of the study in one of these 4 classes were counted as pupils, not as household members. Household denominators varied at each visit, as index children tested positive on different dates, and because infected household members were no longer eligible for testing.

<sup>j</sup> Crude household secondary attack rate among siblings, the numerator includes all positive cases diagnosed from Day 0 to Day 14, the denominator includes all siblings who accepted to participate and who did not test positive in the 15 days before the first case was diagnosed

<sup>k</sup> Crude household secondary attack rate among parents, the numerator includes all positive cases diagnosed from Day 0 to Day 13, the denominator includes all parents who accepted to participate and who did not test positive in the 15 days before the first case was diagnosed

<sup>l</sup> No data on symptoms for two participants

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### **S4. SEROCov-Schools Study Group**

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### **S5. Authors' contribution**

SS, IE, ALH, KPB, AA, EL, MB and IG contributed to the conceptualisation of the study. SS acquired funding. EL, JB, SS and MB participated in the project management and implementation. EL and JB performed contact-tracing interviews. GM and SM analysed all serologies. MB and IE interpreted all virological analyses. EL and MB performed data curation and verified the data. EL did formal analysis. All authors had full access to all the data in the study, participated in the interpretation of the results, and accept responsibility to submit for publication. EL wrote the first draft, and all other authors reviewed and edited the manuscript. The SEROCov-Schools Study Group contributed to the project implementation.

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